REMARKS/ARGUMENTS

Claims 45-88 are currently pending in this application; these claims correspond exactly to originally filed claims 1-44. Claim 45 is amended to make explicit that the claimed sounding pulse is responsive to detection of a handover trigger; Claim 59 is amended to make explicit that the claimed detected sounding pulse is for handover purposes. It is believed that these limitations are already implicit in the respective claims, since in each claim the sounding pulse is recited as being used in connection with handover.

Moreover, several of the independent claims already contain such explicit statements reflecting the use of an omnidirectional sounding pulse for handover. For example:

> 71. A communication network for wireless communication comprising:
> ...
> mobile units, each configured to **transmit an omnidirectional sounding pulse** during a wireless communication via a serving base station **upon the occurrence of a handover trigger event to initiate handover** ...

> 74. In a radio network ... a method for handoff of a wireless communication conducted by a communicating mobile unit via a serving base station to a handover base station comprising:
> **transmitting an omnidirectional sounding pulse** from the communicating mobile unit during the wireless communication **upon the occurrence of a triggering event**; ...

> 83. (Previously presented) A mobile unit ... comprising:
> a transmitter configured to **transmit an omnidirectional sounding pulse based on the occurrence of a triggering event** during a wireless communication conducted via a serving base station; ...

Accordingly, no new issues are raised and new matter is added. It is respectfully submitted that these minor amendments place the claims in form for allowance or in better form for appeal. Entry of these amendments is respectfully requested.

Request for Withdrawal of the Finality of the Office Action

The Applicant respectfully requests that the Examiner withdraw the finality status of the Office Action mailed on June 28, 2006 because the rejections are based upon new art. In the prior Reply, applicant merely reinstated the original claims after the allowance of a number of the original claims had been withdrawn.

It is respectfully submitted that the new rejections now set forth should have been included in the first office action and that applicant should not be penalized for this further rejection of the originally claimed subject matter. In particular, applicant should be afforded the opportunity to make the above clarifying amendments. It is no fault of applicants that the current rejections were not previously made.

Double Patenting Rejection

Claims 45-88 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of U.S. Patent Appln. No. 10/626,165. That application has now been examined so a Terminal Disclaimer is submitted herewith to overcome the obviousness-type double patenting rejection. The withdrawal of the obviousness-type double patenting rejection is respectfully requested.

Claim Rejections - 35 USC §103

Claims 45-88 all stand finally rejected as obvious over Anderson et al. in view of Farwell with the rejection of numerous claims based on various subsidiary references. Claims 59 and 84 also stand finally rejected under as obvious over Budnik et al. in view of Scherzer and Menich. Claims 45 and 71 also stand finally rejected under as obvious over Budnik et al. in view of Anderson et al. These rejections are all traversed.

The present claims are directed to methods and apparatus to effectuate handover of a mobile unit's wireless communication from one base station to another which is initiated by the transmission of an omnidirectional sounding pulse from the mobile unit. This is clearly patentable subject matter as recognized in the

International Search Report of corresponding PCT Application PCT/US03/29468 which stated:

2. CITATIONS AND EXPLANATIONS
Claims 1-44 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the transmitting an omnidirectional sounding pulse from the mobile unit; communicating information related to the detected sounding pulse; selecting the second base station from base stations that detectd the sounding pulse based on the communicated information; and continuing the mobile unit's wireless communication via the selected second base station.

The novel use of a sounding pulse to initiate handover provides advantages over the prior art systems, such as represented by Anderson et al. Using the inventive system, a handover can occur to a base station that the mobile unit may not have even been aware was in its vicinity. For example, when a triggering event occurs, the mobile unit may in fact be quite close to an alternative base station which is communicating with other mobile units using beamformed signaling directed away from the mobile unit. Such a base station could then detect the mobile unit's sounding pulse and then be selected to carry on the communication with beamformed signaling directed at the mobile unit.

The Examiner analogizes the "power control pulse" discussed in Column 9 of Anderson et al. with the claimed sounding pulse. Anderson et al's "power control pulse" is a pulse periodically transmitted by each user station for power control after a connection has been established. Anderson et al. explains:

> Control Pulse
>
> A user station 102 in a cellular environment preferably has means for controlling transmission power to avoid interference with adjacent cells. ...
>
> The present invention achieves power control in one embodiment by use of a power control pulse transmitted periodically from each user station 102. **After establishment of a communication link**, described with regard to FIG. 3 herein, a control pulse time 213 and a third

gap 214 may be reserved just prior to the start of the minor frame 202, in which the user station 102 transmits a control pulse 215. **The control pulse 215 provides to the base station 104 a power measurement of the air channel 203 indicative of the path transmission loss and link quality**. Each user station 102 generally transmits its control pulse 215 in the minor frame 202 allocated to it (e.g., seized by the user station 102).

The control pulse 215 may be received by the base station 104 and **used by the base station 104 to determine information about the communication link it has with the user station** 102. For example, the base station 104 may determine, in response to the power, envelope, or phase of the control pulse 215, the direction or distance of the user station 104, and the degree of noise or multipath error to which the communication link with the user station 102 may be prone.

In response to receiving the control pulse 215, the base station 104 determines the quality of the received signal including, for example, the received power from the power control pulse 215 and the signal-to-noise or interference ratio. The base station 104 then sends a message to inform the user station 102 to adjust its power if needed. Based on the quality of the received signal, the base station 104 may command the user station 102 to change (increase or decrease) its transmit power by some discrete amount (e.g, in minimum steps of 3 dB) relative to its current setting, until the quality of the control pulse 215 received by the base station 104 is above an acceptable threshold.

Similarly, if the base station 104 knows the power setting of the user station 102, then the base station 104 can adjust its own power as well. **The base station 104 may adjust its power separately for each minor frame 202.**

...

Information relating to the control pulse 215 for a particular user station 102 may be **transferred as information in control traffic from one base station 104 to another base station 104** in the case of a base station assisted handoff.

(Anderson et al. col. 8, ln. 61 to col. 10 ln.49; bold emphasis added.

The "power control pulse" is transmitted by each user at a periodic rate so fast that: **The base station 104 may adjust its power separately for each minor frame 202.** It is not a sounding pulse transmitted upon the occurrence of a handover triggering event as claimed. The "power control pulse" transmitted by each user is overhead maintenance of an on-going communication with a particular base station. It is not a sounding pulse which is received by other base stations which in turn would then have to communicate "information related to the detected sounding pulse to the interface by each base station detecting the sounding pulse," as recited in claim 1. This would require each base station to process the reception of each control pulse

in virtually every minor frame and be extremely wasteful of communication recourses.

On page 3 of the Final Action, the Examiner asserts that Anderson "teaches a handoff method and suggests the idea of applying the method of handoff using the pulse signal (Col 10 Ln 46-49, Col. 15 and 16)." This is simply not the case.

Anderson does not teach "communicating information related to the detected sounding pulse to the interface by each base station detecting the sounding pulse" as recited in claim 1, but col. 10, lns 46-49, teaches away from this claim limitation. The Anderson "power control pulse" is designed only for reception by the base station with which the user has a currently established link. If other base stations received the Anderson "power control pulse," there would be no need to: **[transfer information relating to the control pulse] as information in control traffic from one base station 104 to another base station 104**. The other base station to which handover is to be made would already have received the "power control pulse" as a prerequisite for being eligible for becoming the handover base station. Accordingly, the portion of Anderson cited for this claim limitation, actually teaches away from the requirement that all of the base stations receiving the sounding pulse and respond to it.

In Anderson, handoff procedures are explained in detail at columns 15-16 of the Anderson patent. In Anderson, the mobile station is configured to continually monitor multiple base station polling signals.

> At a network-maintenance step 315, **the user station 102 may listen on one or more different air channels 203**, other than the one(s) currently being used by the user station 102, for the general poll message 301 and the specific poll message 302 from nearby base stations 104. The user station 102 continues to communicate on its designated air channel(s) 203 with its current base station 104 and responds as necessary to information messages 303 from that base station 104. However, **unless a handoff procedure is initiated as described below, the user station 102 does not transmit in response to other nearby base stations 104** and therefore does not occupy air channels 203 of those base stations 104. Column 15, lines 9-20.

When handoff is initiated, the mobile unit performs a complex procedure based on its monitoring activity:

> More specifically, a handoff procedure may be initiated when the received signal level at a user station 102 falls below an acceptable level. While the user station 102 receives bearer traffic from its originating base station 405, the user station 102 measures the received signal quality (e.g., RSSI) of its communication link 312. The received signal quality value, together with measurements of the current frame error rate and type of errors, determines the overall link quality. **If the overall link quality drops below a first threshold (the measurement threshold), the user station 102 begins searching for available air channels 203 (i.e., time slots), first from the originating base station 104, and then (using appropriate frequencies and spread spectrum codes) from neighboring base stations 104 of adjacent or nearby cells 103.** The user station 102, as mentioned, preferably has obtained information regarding the identities of neighboring base stations 104 (including spread spectrum code set and frequency information) from the originating base station 405 by downloading the information to the user station 102 during traffic mode or otherwise.
>
> **As the user station 102 scans potential new air channels 203 using the appropriate frequency and/or spread spectrum code set, the user station 102 measures and records the received signal quality.** The user station 102 reads a field carried in all base transmissions 204 which describes the current time slot utilization of the base station 104. The user station 102 uses these two pieces of information to form a figure of merit for the new base station signals, including the originating base station 405, and then sorts the base stations 104 by figure of merit. **This procedure allows the user station 102 to evaluate the quality of available air channels 203 for both the originating base station 405 and other nearby base stations 104.** Column 15, line 53 - column 16, line 18.

There is no sending of a sounding pulse by the mobile unit to initiate a hand off procedure, instead the mobile unit monitors signals being continuously broadcast by the various base stations. What is sent in Anderson et al. is a handoff request to a

specific base station based on the mobile units evaluation of the continuously broadcasted signals received from various base stations.

> If the link quality drops below a second threshold level, then the user station 102 (during a no-bearer time slot) **requests a handoff from the base station 104 with the highest figure of merit (which could be a TSI handoff with the originating base station 405). The handoff is requested by seizing an air channel 203, sending a handoff message request, and waiting for an acknowledgment from the new base station 410.** The handoff signaling message contains a description of the circuit connecting the originating base station 405 to the network, which description was passed to the user station 102 at call establishment time. If the new base station 104 accepts the handoff request (by acknowledging), then the new base station 104 becomes the terminal base station 410. Note that the user station 102 maintains its original air channel 203 connection with the originating base station 405 during this handoff procedure, at least until a new air channel 203 is acquired. Column 16, lines 26-42.

This is not an omni-directional sounding pulse intended for reception by multiple nearby base stations which will result in a handoff selection; this hand off request signal is sent after a selection has already been made by the mobile unit.

Note that claims 74-88 define an alternative embodiment of mobile unit selection of handover base station where, in response to the mobile unit's sounding pulse, the method of claim 74 includes:

> directing a communication beam from base stations detecting the sounding pulse towards the mobile unit;
>
> selecting a handover base station from the base stations that detected the sounding pulse based on the communication beams received by the mobile unit;

This is quite different than the type of monitoring the mobile unit in Anderson et al. performs. There is no suggestion or disclosure in Anderson et al. or the other cited art that beams from base stations are directed to the mobile unit in response to a sounding pulse transmitted by the mobile unit to initiate handover. Kekitalo does

provide a detailed explanation of how the mobile unit can make a determination of which directional signal that it receives would indicate the best candidate base station to which to hand off its communication. However, the fact remains that none of the prior art suggests or discloses transmitted a sounding pulse by the mobile unit to initiate handover.

Anderson et al. simply does not disclose or suggest the broadcast of a sounding pulse by a mobile unit to initiate a handoff procedures. Unlike Anderson et al., the present invention eliminates the need for continual polling broadcasts by the base stations and continual monitoring of such broadcasts by the mobile unit.

On page 7 of the Final Action, the Examiner asserts that Anderson et al. teaches that: "each base station configured to detect sounding pulses (broadly interpreted as control pulses, Col. 9 Ln 15-30; Col 3 [LN] 4-40) emitted from mobile units in order to establish wireless communication with such mobile units." This is simply not the case. To the contrary, Anderson et al. Col. 9 Ln 17-21, specifically recites that the "power control pulses are transmitted after communication has been established: **After establishment of a communication link**, described with regard to FIG. 3 herein, a control pulse time 213 and a third gap 214 may be reserved just prior to the start of the minor frame 202, in which **the user station 102 transmits a control pulse 215.**

Farwell adds nothing to the teachings of Anderson et al. as to the initiation of handover by means of the transmission of an omnidirectional sounding pulse from

the mobile unit. As set forth in the passages cited by the Examiner, in Farwell, the base station 104 initiates hand off requests and communicates both to the system controller (which alerts the other base stations) and to the mobile unit 105. The mobile unit then sends a hopping channel sequence which is received by those base station which had been advised to listen for it by the system controller. This is opposite to the present claims in which mobile unit initiates handoff through the sounding pulse transmission and the base stations which detect the sounding pulse then communicate to the system interface.

Regarding Budnik, Budnik is not analogous art. Budnik discloses a messaging system based on independent base transmitters and base receivers, not a wireless communication system employing base stations for which handover is required.

On page 18 of the Final Action, the Examiner asserts that Budnik: "teaches a radio network having a plurality of bases stations (base transmitters and base receivers. C3 Ln 15-35) ..." At col. 3, lns. 29-35, Budnik states:

> It will be appreciated that the base receivers 117 and the base transmitters 116 can be collocated at some sites and physically separated at other sites in the system. It will be further appreciated that the quantity of base receivers 117 and base transmitters 116 can differ in a given system, more base receivers than base transmitters being the norm.

Independent base transmitters and base receivers are simply not the same as base stations. By definition a base station has both a transmitter and a receiver. There is no pairing of base transmitters and base receivers in Budnik for the

establishment of a wireless communication between a mobile unit and a base station as claimed.

There is no initiation of handover by mobile units in Budnick, because the concept of handover of a mobile unit's communication from one base station to another is simply inapplicable in the Budnick type system. All communication between Budnik's mobile units pass through the Budnik controller 112 which in essence defines a single super base station having a pluraltiy of transmitters and receivers, not a plurality of base stations as defined by the present claims. Accordingly, there is no teaching or suggestion in Budnik of transmission of a sounding pulse by a mobile unit to initiate handover of a mobile unit's communication from one base station to another.

The prior art references simply do not disclose or suggest the broadcast of a sounding pulse by a mobile unit to initiate handover of a mobile unit's communication from one base station to another. Accordingly, the further new grounds of rejection should be withdrawn.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to materially advance the prosecution of this

application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application, including claims 45 - 88, is in condition for allowance. Withdrawal of the rejections and/or finality of same, entry of the claim amendment and a notice of allowance are respectfully requested.

Respectfully submitted,

Cave et al.

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